

REMARKS

This application has been carefully considered in light of the Initial Office Action of March 12, 2003. As a result, claims 9-11 have been cancelled without prejudice and claims 1 through 8 amended and new Claims 12-19 added. New claim 15 is directed generally to the subject matter of a ball bearing as defined by original claim 9 including the amendment currently being made to claim 1. The claims which depend from claim 15 are also directed to the ball bearing structure.

With respect to the Restriction Requirement, claim 11 has now been cancelled subject to applicants' rights to file a divisional application with respect thereto.

Claims 1 through 4, 6, 8 and 9 have been rejected under 35 U.S.C. 102(b) as directly anticipated by the European reference to Ducrue 0 288 334.

Claim 5 has been rejected under 35 U.S.C. 103(a) as being unpatentable over the primary reference to Ducrue when further considered in view of the teachings of US patent to Berger

2,833,244. Claim 7 has been rejected under 35 U.S.C. 103(a) as being obvious and therefore unpatentable over the primary reference to Ducrue. Claim 10 has been rejected under 35 U.S.C. 103(a) as being obvious and therefore unpatentable over Ducrue when further considered in view of the US Patent to Albrecht et al. 5,768,060.

The primary reference to Ducrue is discussed in the related art portion of the present specification at page 2 beginning at line 8. It should be noted, that this application discloses a bearing cage which is produced from a flexible band. The cage is provided with a slot defined between the ends of the band as shown at "n" and as shown in Fig. 3 of the reference. In some embodiments a ball is placed within the space "n" as is shown in Figs. 6 and 7 at 3i.

As discussed in the present specification, the provision of a flexible band which is placed between the inner and outer bearing rings creates a slot which constitutes a zone of potential weakness of the cage which may lead to deformations especially due to the flexible nature of the band. The flexibility and the spacing in the band can result in release of balls from the inner and outer races defined by the inner and outer bearing rings particularly if the bearing is subjected to

vibrations in an axial direction.

It was, therefore, one of the primary purposes of the present invention to provide a bearing structure which overcame the shortcomings such as disclosed in the European application reference to Ducrue. In the present invention, the bearing cage is formed by machining or casting the cage so as to be rigid and generally annular such that balls associated with the cage are provided within first recesses on one side of the cage and other balls are located in recesses provided on an opposite or second side of the cage. Such a structure, as disclosed in the present application, will retain balls contained within the cage structure even when the bearing is subjected to vibrational forces. Further, the present invention has the added utility of allowing a close spacing between the ball elements due to the provision of the recesses and the balls positioned on opposite sides of the cage.

The reference to Ducrue teaches directly away from the structure of the present invention because the structure must be a flexible band. the band is designed to be deformed or bent in order to be placed between the inner and outer bearing rings.

With the present invention, the cage is solid and is prepared by machining or casting such that a generally annular or circular rigid body is formed for supporting the balls associated with the bearing.

Further, as previously noted, the band of the reference to Ducrue results in a slot being formed between opposite ends of the flexible band and such a slot can result in deformation of the band during use, especially when subjected to vibrations. Such deformation may result in one or more of the balls being able to be ejected from their respective supporting recesses shown at 7 and 12. Further, in the embodiments shown in Figs. 6 and 7 of the reference to Ducrue, if a ball 3i is placed in the slot "n", there is no positive guidance for such a ball and the ball can be ejected as the bearing is subjected to severe vibrational conditions.

In view of the foregoing, reconsideration of the grounds for rejection under 35 U.S.C. 102(b) with respect to claim 1 and the claims depending therefrom with respect to the reference to Ducrue is respectfully requested.

In rejecting claim 5, the Examiner has combined the

teachings of the reference Berger with the reference to Ducrue. It is respectfully submitted that such a modification to the structure to Ducrue using the teachings of the reference to Berger would not result in a bearing ring cage having an opening which would allow a tool to be inserted for ejection of a ball placed within one of the recesses associated with the cage, as is the cage with the present invention. In the reference to Berger, the openings, such as shown at 34 in drawing Fig. 9 of the reference, are provided in oppositely oriented segments of the members which enclose the balls 32. In this position, a tool cannot be inserted through the openings in order to eject the balls as any force of ejection would be opposite to the opposing segment of the ball enclosure. The openings 34 are provided for purposes of allowing oil to flow into the space between the retaining segments and the balls 32.

In view of the foregoing, the purpose and structural location of the openings shown in the reference to Berger is not the same as that of the present invention. Therefore, it is submitted that one of ordinary skill in the art would not look to modify the reference to Ducrue by providing openings in the flexible band. Further, if the openings were provided in Ducrue,

the openings would have to be provided through the thin flexible body and the openings would probably not be sufficiently large enough to allow a tool to be inserted therethrough without destroying the integrity of the band itself, as the band is not designed to have any openings through any of the wall portions taken through the thickness of the band.

In view of the foregoing, reconsideration of the grounds for rejection with respect the claim 5 is also respectfully solicited.

Concerning the rejection of claim 7 for obviousness, it is believed that claim 7 should be allowable not only for the additional structure defined thereby but also for the same reasons as discussed with respect to the difference between the present invention and the prior art reference to Ducrue concerning the rejection under 35 U.S.C. 102(b). Similarly, reconsideration of the grounds for rejection for obviousness of claim 10 is also respectfully requested in light of the difference of the present invention and the prior art reference to Ducrue as set forth above.

The remaining prior art made of record but not relied upon in rejection of the original claims has also been considered. None of the additional prior art listed at paragraph 11 of the

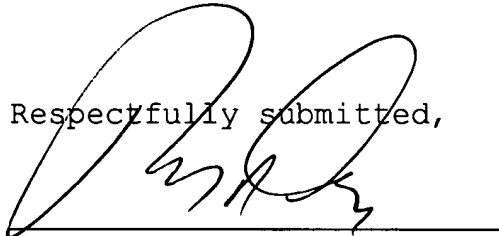
Application No. 10/024,713
Amendment dated June 11, 2003
Reply to Office Action of March 12, 2003

Official Action are believed to disclose the inventive features of the present invention as set forth in the claims as amended.

In light of the foregoing, it is requested that favorable consideration be given to claims 1 through 8 and new claims 12 through 19 and that the application be passed to issuance.

Should the Examiner have any questions concerning this response or the amendments being made either to the specification or claims, it would be appreciated if the Examiner would contact the undersigned attorney of record at the telephone number shown below for further expediting the prosecution of the application.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'R. Dowell', is written over a horizontal line.

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Date: June 12, 2003

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